In the Claims:

Claims 1-26 (Canceled).

Claim 27 (Currently Amended). A system for neutralizing fluid chemical waste products that result from a chemical production process and are collected from the production line, said system comprising:

a pyrolysis/reaction chamber having a wall and three or more openings in said wall through which one or more plasma torches are inserted, through which one or more inlet conduits pass, and to which an exit conduit is connected;

a pre-pyrolysis subsystem comprising a ~~container to collect said waste~~ connection to said production line, a valve to regulate the flow rate, and a pump, which pumps said waste from said ~~container~~ production line through said inlet conduits;

a post-pyrolysis subsystem;

sensors that provide information concerning various operating parameters at different locations in said system;

a control unit that utilizes information provided by said sensors as well as other information provided to it from other sources in order to optimize and automate the operation of said system; ~~and~~

a display system to provide the operator of said system with information concerning the operation and operating parameters of said system; and

~~characterized by:~~

an atomizer being attached at the end pointing into said chamber of each of said inlet conduits through which said pump pumps said waste, thereby atomizing said ~~liquid~~ fluid waste and creating a jet of small droplets; ~~and~~

each of said atomizers ~~is~~ being located opposite the at least one plasma stream/s created by said plasma torch/es, ~~wherein said location of said atomizers provides the conditions for effective contact of said droplets with said plasma stream/s~~ thereby spraying said jet of small droplets directly into said plasma stream/s causing the molecules of which said droplets are comprised to be instantaneously disassociated into their constituent atoms or ions, which then recombine to form the gas phase of different types of stable molecules inside said pyrolysis/reaction chamber.

Claim 28 (Previously Presented). A system according to claim 27, wherein the system is located in the vicinity of the end of the production line and the fluid chemical waste products are neutralized immediately after they exit said production line.

Claim 29 (Previously Presented). A system according to claim 27, comprising facilities for temporarily storing and neutralizing the fluid chemical waste products after they exit the production line.

Claim 30 (Previously Presented). A system according to claim 27, wherein the pyrolysis/reaction chamber is a double-walled chamber, comprising a space between said walls through which water is caused to circulate, thereby cooling said pyrolysis/reaction chamber.

Claim 31 (Previously Presented). A system according to claim 30, wherein the walls of the chamber are made of stainless steel.

Claim 32 (Previously Presented). A system according to claim 27, wherein the pyrolysis/reaction chamber has a metal wall, which is lined on the inside with refractory material.

Claim 33 (Previously Presented). A system according to claim 27, comprising means controlling the temperature of the plasma stream, said means selected from the following group:

adjusting the distance between the electrodes;

adjusting the value of the current flowing between the electrodes; and

adjusting both the distance and the value of the current flowing between the electrodes.

Claim 34 (Previously Presented). A system according to claim 33, comprising means for adjusting the current while the torch is operating.

Claim 35 (Previously Presented). A system according to claim 27, wherein the control system comprises components that are capable of performing one of more of the activities selected from the following group:

acting as an input unit to said system;

storing information;

performing computations.

Claim 36 (Previously Presented). A system according to claim 27, wherein the post-pyrolysis subsystem comprises a particle trap to remove any solid particles from the mixture of product gases.

Claim 37 (Previously Presented). A system according to claim 27, wherein the post-pyrolysis subsystem comprises a radiation cooler to rapidly reduce the temperature of the mixture of product gases.

Claim 38 (Previously Presented). A system according to claim 27, wherein the post-pyrolysis subsystem comprises at least one spray tower comprising an entrance in its lower end and means for creating a downward spray of water droplets, whereby when the mixture of product gases is introduced into said spray tower through said entrance, said product gases will rise in said tower through said spray of water droplets, thereby dissolving at least one of the components of the mixture of product gases in water.

Claim 39 (Previously Presented). A system according to claim 38, wherein the post-pyrolysis subsystem comprises a storage vessel for collecting the solution comprising at least one of the components of the mixture of product gases dissolved in water, and a pump for recycling said

solution through the means for creating the downward spray of water droplets in the spray tower until the concentration of said component in said solution reaches a predetermined value.

Claim 40 (Previously Presented). A system according to claim 27, wherein the post-pyrolysis subsystem comprises monitoring equipment to measure the composition of the mixture of product gases at selected locations.

Claim 41 (Previously Presented). A system according to claim 27, wherein said system has a size and weight that allow said system to be transported from location to location and placed in position at an appropriate place in an existing production line.

Claim 42 (Previously Presented). A method for neutralizing fluid chemical waste products that result from a chemical production process and are collected from the production line, said method comprising:

providing a system according to claim 27;

activating the plasma torch to produce a plasma stream having a predetermined temperature;

activating the pre-pyrolysis subsystem to cause said waste to flow through the atomizer thereby creating droplets which effectively contact said plasma stream whereupon the molecules of said waste dissociate into atoms or ions;

creating predetermined conditions of temperature and concentration of said atoms and ions such that predetermined chemical reactions take place; whereby, following the migration of said atoms or ions from the immediate region of said plasma stream, a gaseous mixture of recombination products is formed;

activating the post-pyrolysis means to neutralize at least some of said recombination products; and

releasing said recombination products to the surroundings and/or collecting said recombination products.

Claim 43 (Previously Presented). A method according to claim 42, wherein the fluid chemical waste products can be one or more of the types selected from the following group:

liquid;

gas; and

solid heated to its melting point or dissolved in a solvent to form a stable solution.

Claim 44 (Previously Presented). A method according to claim 42, wherein the system is located in the vicinity of the end of the production line and the fluid chemical waste products are neutralized immediately after they exit said production line.

Claim 45 (Previously Presented). A method according to claim 42, wherein the fluid chemical waste products are temporarily stored after they exit the production line and then are neutralized.

Claim 46 (Previously Presented). A method according to claim 42, wherein a major component of the chemical waste products is comprised of bromine or bromine products.

Claim 47 (Previously Presented). A method according to claim 46, wherein the chemical waste products result from the production of tetrabromobisphenol A (TBBA).

Claim 48 (Previously Presented). A method according to claim 42, wherein the value of the current flowing between the electrodes of each plasma torch can be adjusted while the torch is operating.

Claim 49 (Previously Presented). A method according to claim 42, wherein the energy requirement of the plasma torch/es is determined from the disassociation energies of the molecules of which the waste is comprised.

Claim 50 (Previously Presented). A method according to claim 42, wherein the composition of the gases that comprise the mixture of product gases is calculated using principles of kinetic equilibrium and the results of the calculation are used to design the post-pyrolysis subsystem.